

San Francisco State University School of Engineering

Course Outline for ENGR 206 Electric Circuits and Instrumentation

Bulletin Description:

ENGR 206 Electric Circuits and Instrumentation (1 unit)

Prerequisite: ENGR 205 (may be taken concurrently)

Introduction to electrical measurements and laboratory instrumentation. Verification of circuit laws and theorems. Basic operational amplifier circuits. AC steady-state behavior and frequency response. Transient characteristics of first-order circuits. Introduction to Pspice/B2Spice. Extra fee required.

Manual and Website:

<https://faculty.sfsu.edu/~mojan/>

References:

1. Electric circuits textbook used in ENGR 205
2. Technical and operating manuals for various instruments used in the lab.
3. B2spice reference manual.

Prerequisites by Topic:

1. Electrical quantities and units
2. Ohm's and Kirchhoff's laws
3. Linearity and superposition
4. DC circuit analysis
5. Characteristics of waveforms
6. AC circuit analysis
7. Operational amplifiers
8. Frequency-domain analysis
9. Transient behavior of simple circuits
10. Working knowledge of desktop computers

Course Objectives*:

- I. To become familiar with the operations of basic laboratory instruments through hands-on experimentation. [A.3, B.3]
2. To develop a better understanding of the concepts in linear electronic circuits by observing and interpreting the behaviors of real circuits. [A.3, A.5, B.2]
3. To acquire a rudimentary knowledge of a computer-based circuit analysis software, Pspice/B2Spice. [B.3]

* Indices in brackets refer to the objectives and outcomes of the School of Engineering.

Topics:

1. Laboratory Procedures and Safety
2. Digital Multimeter and Power Supply
3. Kirchhoff's Laws

4. Circuit Analysis and Equivalent Circuits
5. AC Measurements
6. Oscilloscopes
7. Characteristics of Waveforms
8. Time-Domain Analysis
9. Frequency-Domain Analysis
10. Operational Amplifiers
11. Pspice/B2Spice analysis of RC circuits

Professional Component:

Engineering Design 100%

Engineering Science 0%

Evaluation:

1. Lab reports 50%
2. Quizzes 25%
3. Final Exam 25%

Performance Criteria*:

Objective 1:

- 1.1 The student will demonstrate an ability to work with power supplies. [1, 2, 3]
- 1.2 The student will demonstrate an ability to work with signal generators. [1, 2, 3]
- 1.3 The student will demonstrate an ability to work with multimeters. [1, 2, 3]
- 1.4 The student will demonstrate an ability to work with oscilloscopes. [1, 2, 3]
- 1.5 The student will demonstrate an ability to measure voltage, current, time, and relative phase angles in an electric circuit. [1, 2, 3]
- 1.6 The student will demonstrate knowledge of loading effects and instrumentation errors in physical measurements. [1]

Objective 2:

- 2.1 The student will demonstrate a skill to implement simple linear circuits from schematic diagrams. [1, 2, 3]
- 2.2 The student will demonstrate knowledge of simple linear circuits by relating observed results to theory.[1]
- 2.3 The student will demonstrate ability to present technical information in written form. [1]

Objective 3:

- 3.1 The student will demonstrate basic knowledge of Pspice/B2Spice for steady state and transient analysis of simple circuits. [1]

Numbers in brackets refer to evaluation methods used to assess student performance.

Instructor: Mojan Norouzi

Email: mojan@sfsu.edu

Office Hours: HH-808B, Thursday, 9:15pm-10:15pm

Class/Laboratory Schedule:

One 2 hour 45 minute lab session/week

I. Disability access

Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email (dprc@sfsu.edu). For more information: <http://www.sfsu.edu/~dprc>

II. Student disclosures of sexual violence

SF State fosters a campus free of sexual violence including sexual harassment, domestic violence, dating violence, stalking, and/or any form of sex or gender discrimination. If you disclose a personal experience as an SF State student, the course instructor is required to notify the Dean of Students. To disclose any such violence confidentially, contact:

The SAFE Place - (415) 338-2208; http://www.sfsu.edu/~safe_plc/

Counseling and Psychological Services Center - (415) 338-2208; <http://psyservs.sfsu.edu/>

For more information on your rights and available resources: <http://titleix.sfsu.edu>